BANGALORE ELECTRICITY SUPPLY COMPANY LIMITED

BID ENQUIRY NO: 130

Name of the Work: "Supply, Installation and Commissioning of new HRC Fuse switch based, Thermo Setting Plastic enclosure, LT Feeder pillar Box and Replacement of Existing deteriorated Conventional type(Metal) Feeder Pillar Box by new HRC Fuse switch based, Thermo Setting Plastic enclosure, LT Feeder pillar Box at various identified locations of BMAZ & BRAZ Area".

SECTION -VII
TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATIONS OF HRC FUSE SWITCH BASED, THERMO SETTING PLASTIC ENCLOSURE, LT FEEDER PILLAR BOXES AND ALL ACCESSORIES ARE GIVEN BELOW

The HRC fuse switch based, Thermo Setting Plastic Enclosure, LT Feeder pillar boxes shall generally conform to the sketches enclosed and comply with the following requirements.

2.1 MANUFACTURE/CONSTRUCTION OF ENCLOSURE:

The Pillar box enclosure shall be machine made out of Thermoset plastic under compression and temperature.

The Pillar box enclosure should be modular in structure. Pillar box enclosure should have a uniform depth of 322 mm. The impulse withstand voltage shall be 8KV.The rated short time withstand current shall be 25 kA for 1 sec RMS and peak of 52.5kA for phase busbar system. The Pillar box enclosure should further withstand a fault arc(class A) of 10KA for 300ms as per DIN EN 61439-2. Pillar box enclosure shall confirm to dry heat test of part 10.2.3.101 of DIN EN 61439-5. The Pillar Box enclosure shall be verified mechanical impact as per Part 10.2.101 of DIN EN 61439-5. The IP rating of Pillar box enclosure should be IP44 as per DIN EN 60529 degree of protection of enclosed equipment. The Category of flammability test of pillar box enclosure shall be verified as per part 10.2.3.102 of DIN EN 61439-5. Resistance to ultra-violet radiation of pillar box enclosure shall be verified as per part 10.2.4 of DIN EN 61439-5.

The Pillar box enclosure should be fully front access ready. The hinges should be concealed. Pillar Box shall have gang operated Fuse switch Disconnector with HRC fuselinks on both incoming and outgoing circuit’s with necessary interconnecting Bus Bars.
Busbar supports should be internally moulded in the enclosure. No additional bus bar supports to be used.
Standard General Arrangement of Incoming fuse switch Disconnector and Outgoing fuse switch disconnector with HRC fuse link, Neutral and phase busbars, inside the Box is shown in the General arrangement drawings.

Suitable work needs to be done on the doors and back sheet for mounting laminated advertisement.

The Thermoset plastic enclosure should be type tested as

per standard of Resistance to corrosion, Verification of thermal stability of enclosures, Verification of resistance to static load, shock load, resistance to torsional stress, mechanical strength of doors, Mechanical Impact, testing of enclosures made of insulating

Material and Determination of the power loss capability of an enclosure by test. Necessary type test certificates proving the above in M/s CPRI or ERDA or Government Laboratories/Testing Houses only according to DIN EN ISO /IEC 17025 should be furnished. All the type tests should have been conducted within five years as on date of bid submission.

2.2 CIRCUIT WAYS AND BUS BAR:

The HRC fuse switch based LT Feeder pillar boxes shall be of 3 phase (R, Y, B) arrangement. The Center to center distance between Bus bar should be 185mm.

2.2.1 BUS BAR ASSEMBLY:

The bus bars shall be made up of electrolytic grade aluminium confirming to grade 63401 WP of IS : 5082 (With latest Amendments). The bus bar assembly should be 50mm x 12mm Aluminium flat which would form the current carrying main bus for the LT Feeder pillar box. Both ends of Aluminium flat should be fixed internally moulded in the enclosure without any additional support. The assembly should be as shown in the sketch.

2.3 INCOMERS:

Rating and Type of switching: The pillar box shall have two incomers of 630A three pole gang operated vertical fuse switch disconnector Lockable with 3 padlocks in ON and OFF positions in safe park position to ensure proper closing/opening of switch. When the switch handle is in park position the fuse switch should not be operable without releasing the park position interlock.

Fuse Holding contact Details: The fuse switch design should be such that large arcs are not produced during switching and the contacts should have sacrificial electrodes to conduct and quench any arc away and reduce contact wear. No additional device like arc-chutes should be used for quenching of arcs. The fuse switch contacts should have four parallel line contact, should be made of 99.9% copper, silver plated with 3.5 to 5µm thickness. Other copper parts should be tin plated with 3.5 to 5 µm thickness. Other than current carrying parts, all other parts should be made of suitable insulating

material. The contacts should have in built short circuit interlock to prevent pinch effect.

Rated Short time capacity details: The Fuse switch dis-connector should have a Rated conditional short-circuit current of 120KA. The Rated short time withstands current I_{CW} of the Fuse switch disconnector should be 15KA for 1 Second.

Utilization category: The utilization category of the Fuse switch disconnector shall be AC23B at a rated operational current I_e of 630A and rated operational voltage U_e of 400V.

Rated Impulse withstand voltage: The rated impulse withstand voltage U_{imp} of the Fuse switch disconnector shall be 12KV with impulse withstand test voltage of $U_{1.2/50\mu s}$ with a peak value of 20KV across the open main contacts of equipment suitable for isolation.

Insulating Material Details: The fuse holder should be made of polyamide with reinforced fibre glass. The device base/carrier should be made of fibre glass reinforced duroplastic (thermosetting plastic). Further the fuse holding contacts should be shrouded against any accidental hand touching when the strip top is removed. The fuse holding contacts should be so designed to contact fuse blade at right angle.

Fuselink Rating and Size details: The Fuse switch disconnector shall be capable of taking a maximum of 630 A size 3 HRC fuses or any lower rating of size1 and size2 fuses. The incomer Fuse switch disconnector shall be provided with 315 Amps, size 2, HRC fuse links(6Nos.).

IP Protection: The fuse switch disconnector shall be switchable without any special switching sequence. The IP rating of the Fuse switch disconnector should be IP30 from front side fitted with clamp and lateral covers at an operational status as per IEC-60529 Degrees of protection of enclosed equipment.

Glow Wire Test: The fuse switch disconnector Parts of insulating materials necessary to retain current-carrying parts in position shall confirm to the glow wire tests of 8.2.1.1.1 of IEC60947-1 at a test temperature of $960^{O}C$.

Switch Operation details: Insertion and removal of the HRC fuse should be protected against accidental contact (finger proof protected). Switching on and off with HRC fuse links under load condition should be performed with single hand operation, with low switching force and wear free contacts. The fuse switch

disconnector should have windows easily visible for indicating the HRC fuses blown out condition in both middle and top of the fuse. It should be possible to measure the voltage across a fuse holding contact without opening the switch. The switch should be of hinged operation. Parallel switching devices are not accepted.

Cable terminal and connections details: The fuse switch disconnector should be provided with suitable terminals to terminate 240 Sq.mm XLPE Aluminium cable each phase using M12 bolt type connection using crimping bimetallic sockets. The connection between main bus bar and fuse switch should be by bus bar only and not by cables. The switch shall have Center to centerbusbar mounting distance between phases should be 185mm.

2.3.1 OUTGOING:

Rating and type of switching: The pillar box shall have seven outgoings of 160A three pole gang operated vertical fuse switch disconnector lockable with 2padlocks in ON and OFF positions in safe park position to ensure proper closing/opening of switch. When the switch handle is in park position the fuse switch should not be operable without releasing the park position interlock.

Fuse Holding contact Details: The fuse switch contacts should have two parallel line contact. The fuse switch design should be such that large arcs are not produced during switching. No additional device like arc-chutes should be used for quenching of arcs. Other than current carrying parts, all other parts should be made of suitable insulating material.

Rated Conditional Short circuit Current: The Fuse switch disconnector should have a Rated conditional short-circuit current of 120KA.

Utilization category: The utilization category of the Fuse switch disconnector shall be AC23B at a rated operational current I_e of 160A and rated operational

voltage U_e of 400V.
Rated Impulse withstand voltage: The rated impulse withstand voltage $U_{imp}$of the Fuse switch disconnector shall be 8KV with impulse withstand test voltage of $U_{1.2/50\mu s}$ with a peak value of 12KV across the open main contacts of equipment suitable for isolation.

Fuselink Rating and Size details: The Fuse switch disconnector shall be capable of taking a maximum of 160 A size 00 HRC fuses or lower rating of size 00 and 000 fuses. The outgoing fuse switch disconnector shall be provided with 100A/63A size 000 HRC fuse links.

Fuse rating	Twelve Way
100A, Size 000	6Nos
63A, Size 000	15Nos

IP Protection: The IP rating of the Fuse switch disconnector should be IP20 from front side at on operational status as per IEC60529 Degrees of protection of enclosed equipment.
Insulating Material Details: The fuse holder should be made of polyamide with reinforced fibre glass. The device base/carrier should be made of fibre glass reinforced duroplastic (thermosetting plastic). The viewing windows and dropper cover plates shall be made of polycarbonate. Further the fuse holding contacts should be shrouded against any accidental hand touching when the strip top is removed.

Glow Wire Test: The fuse switch disconnector Parts of insulating materials necessary to retain current-carrying parts in position shall confirm to the glow wire tests of 8.2.1.1.1 of IEC60947-1 at a test temperature of 960 degree C.

Switch Operation details: Insertion and removal of the HRC fuse should be protected against accidental contact (finger proof protected). Switching on and off with HRC fuse links under load condition should be performed with single hand operation and wear free contacts. The fuse blown indicator should be clearly visible in top and middle of fuse through fuse switch integral polycarbonate transparent windows without need of any additional indicator. The fuse switch should be of hinged operation. Parallel switching devices are not accepted.
Cable terminal and connections details: The fuse switch disconnector should be provided with suitable terminals

to terminate either 1No of 10 - 95Sq.mm or 2Nos of 10-25Sq.mm XLPE Aluminium cable each phase using bolt type connection using crimping sockets. The connection between main bus bar and fuse switch should be by bus bar only and not by cables. The switch

shall have center to center busbar mounting distance between phases should be 185mm.
Necessary type test certificates proving the above from M/s CPRI or ERDA or Government Laboratories/Testing Houses only according to DIN EN ISO /IEC 17025 should be furnished as per as per IS/IEC 60947-1 and 60947-3 along with bid.

2.4. FUSE LINKS:

Manufacturer's name, current rating, breaking capacity and type shall be marked on HRC fuse links. The fuse links in the incomers and outgoing fuse switch disconnectors shall be as per IS- 13703/IEC-60269. The rated breaking capacity shall be 120 KA.

2.5. NEUTRAL BUS BAR:

The neutral bus bar provided in the pillar boxes shall be of **50 x 12 mm** size Aluminium flat of adequate length with 2Nos of 14mm hole and 20Nos of 9mm as per the sketch enclosed. The neutral bus shall be firmly fixed within enclosure.

2.6 MARKING:

The position of the poles (phases) may be indicated by appropriate coloring viz., RED, YELLOW AND BLUE. Incoming and Outgoing circuits may be indicated/marked with appropriate labeling.

2.7 DIMENSIONS:

The sketch enclosed shows the details of HRC fuse switch 12Way thermoset plastic LT Feeder pillar box and the dimensions & the number of circuit ways to be provided are exactly as shown in the enclosed sketch.

Details	**Dimensions**
i) Breadth of Pillar box.	790 mm
ii) Depth of Pillar Box	322 mm
iii) Height of Pillar box	862 mm
iv) Center to center Distance between busbar	185 mm
v) Length of Aluminium flat	765 mm
vi) Number of circuit ways	12way
Tolerance as per IS/ IEC standards	

2.8. Vermin Entry Prevention

At the bottom of the Pillar box Vermin Entry Prevention should be made with suitable cable entry.

3.0 ADVERTISEMENT

Advertisement provision should be made in the feeder pillar box, for a size of (600mm x 400mm) in front door as well as back as shown in the drawings.

4.0 TYPE TEST:
The Bidders shall submit the complete type test reports for the HRC FUSE switch disconnectors as per IS/IEC 60947-1 and 60947-3 and thermoset plastic enclosure as per DIN EN 61439-1, DIN EN 61439-2 and DIN EN 61439-5.

5.0 INSPECTION:
The supplier shall afford necessary facilities to the BESCOM representative to inspect the material before dispatch of material. All the routine tests as specified shall be conducted in the presence of BESCOM representative. The supplier must intimate the programme of test 10 days in advance to enable this office to depute the representative for witnessing the test.

6.0 INSPECTION AND TESTING BEFORE DISPATCH:
The material will be inspected by Engineers of the BESCOM or its authorized representative before dispatch. All routine tests shall be conducted in the presence of designated person. The approval for the tests or test certificate shall be obtained and also the dispatch instructions shall be obtained before dispatch of the goods. Any materials found to be not in conformity with the specification as detailed in the schedule will be rejected. The supplier has to replace them by good ones immediately and the second inspection at the Factory premises shall be at supplier cost as per BESCOM norms. BESCOM may accept replacements conforming to the specification.

7.0 INSPECTION AFTER RECEIPT OF MATERIALS:
The material will be inspected on site. If material is found to be not in conformity with the specification as detailed

in the schedule, it will be rejected. In such cases, the supplier has to take back the

rejected material at his own cost and again offer for inspection duly paying the re-inspection charges as per the norms.

8.0 TEST CERTIFICATE:
All routine tests as specified in the relevant clauses shall be conducted and test reports in the form of test certificates duly signed by a responsible officer of your organization shall be submitted to the inspecting officer at the time of inspection.

9.0 DELIVERY OF MATERIALS AND DISPATCH INSTRUCTIONS: No materials/equipment shall be dispatched until test certificate wherever applicable, are approved and dispatch instructions have been given.

10.0 COMPLETION OF SUPPLY:
The materials shall be supplied complete with required specifications for their efficient operation

11.0 DISPOSAL
The disposal of the thermoset plastic feeder pillar box shall be the responsibility of the bidder as per the guidelines specified by Central Pollution Control Board after useful life.

-Sd-
General Manager (El)
DAS, SG & TIC,
B ESCOM